WIRELESS POWER TRANSMITTER AND WIRELESS POWER TRANSMISSION METHOD

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims the benefit under 35 USC §119(a) of Korean Patent Application No. 10-2015-0108876 filed on Jul. 31, 2015, in the Korean Intellectual Property Office, the entire disclosure of which is incorporated herein by reference for all purposes.

BACKGROUND

[0002] 1. Field

[0003] The following description relates to a wireless power transmitter and a wireless power transmission method.

[0004] 2. Description of Related Art

[0005] In accordance with the development of wireless technology, various wireless functions, ranging from the transmission of data to the transmission of power, have been enabled. Particularly, a wireless power charging technology capable of charging an electronic device with power, even in a non-contact state, has recently been developed. In the field of wireless power charging technology, it is desirable to determine whether a wireless power receiver, i.e., a charging target, has come into proximity with a wireless power transmitter. To this end, according to the related art, a short beacon signal may be transmitted for a predetermined period to determine whether a wireless power receiver has come into proximity with the wireless power transmitter. When it is determined that the wireless power receiver has come into proximity with the wireless power transmitter, the wireless power transmitter transmits power wirelessly.

[0006] However, according to the related art, it may be difficult to accurately determine whether or not a new wireless power receiver or a foreign material has come into proximity with the wireless power transmitter, while the wireless power transmitter wirelessly transmits the power to the wireless power receiver.

SUMMARY

[0007] This Summary is provided to introduce a selection of concepts in a simplified form that are further described below in the Detailed Description. This Summary is not intended to identify key features or essential features of the claimed subject matter, nor is it intended to be used as an aid in determining the scope of the claimed subject matter.

[0008] In one general aspect, a wireless power transmitter includes a sensor configured to sense an object, a power transmitter configured to wirelessly transmit power to a wireless power receiver, and a controller configured to determine whether the object is the wireless power receiver, and control the power transmitter to wirelessly transmit power to the wireless power receiver upon the object being determined to be the wireless power receiver, wherein the sensor and the power transmitter comprise separate coils.

[0009] The power transmitter may be configured to wirelessly transmit the power using a transmitting coil, and the sensor may be configured to sense the object coming into proximity therewith using a sensing coil configured to operate regardless of whether the transmitting coil is operating.

[0010] The sensor may be configured to sense the object in proximity therewith, while the power transmitter wirelessly transmits power to the wireless power receiver.

[0011] The sensor may be configured to transmit a short beacon signal under control of the controller, and may sense a change in impedance of the short beacon signal to determine whether an object is coming into proximity therewith.

[0012] The power transmitter may include a first resonator comprising a transmitting coil, and a first power amplifier configured to provide power to the first resonator. The sensor may include a second resonator comprising a sensing coil, and a detector configured to detect a current or a voltage for the second resonator. The sensor may include a second power amplifier configured to provide power to the second resonator.

[0013] The wireless power transmitter may further include a wireless communicator configured to form a local area wireless communications network with the wireless power receiver. In response to the sensor being configured to sense the object, the controller may be configured to use the local area wireless communications network to determine whether the corresponding object is the wireless power receiver.

[0014] The sensor may be configured to send a long beacon signal to initiate a wireless communication signal from the wireless power receiver.

[0015] In another general aspect, a wireless power transmitter includes a power transmitter comprising a transmitting coil configured to magnetically couple to a receiving coil of a wireless power receiver, a sensor comprising a sensing coil configured to sense an object, and a controller configured to control the power transmitter to wirelessly transmit power to the wireless power receiver, upon the object sensed by the sensor being determined to be the wireless power receiver.

[0016] The power transmitter may be configured to supply power to the transmitting coil based on control from the controller, and the transmitting coil may be configured to transmit the power to the receiving coil.

[0017] The sensor may be configured to supply the power to the sensing coil according to the controller and to transmit a short beacon signal, and may sense a change in impedance of the transmitted short beacon signal to sense an object. The controller may be configured to control the sensor to transmit the short beacon signal through the sensing coil, and may be configured to maintain transmitting the short beacon signal in response to the transmitting coil wirelessly providing power to the receiving coil.

[0018] The sensor may be configured to transmit a short beacon signal with a preset period, and sense a change in impedance of the transmitted short beacon signal to determine an approach of the object.

[0019] The wireless power receiver may be coupled to a mobile device.

[0020] The sensor may be configured to send a long beacon signal to initiate a wireless communication signal from the wireless power receiver.

[0021] Other features and aspects will be apparent from the following detailed description, the drawings, and the claims.